

Incorporating cooperative learning
activities in *GEOL 0840: Introduction
to Environmental Science* lecture and
recitation

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GEOL 0840:

Introduction to Environmental Science

- ~150 Students
- Intro course for Environmental Science (BS) and Environmental Studies (BA) majors
- Natural Science General Education Requirement

Course Content Goals

- Explain how the scientific method is used to investigate environmental issues
- Describe core concepts from biology, chemistry, and geology related to environmental issues
- Communicate the environmental consequences of increasing human populations (example: air, water and soil pollution)

GOALS for Course Transformation

- To improve student understanding and retention of course content
- To increase student engagement in lecture and recitation
- To better integrate recitation and lecture material

GOALS for Course Transformation

- Convert one lecture per week to an active learning activity
- Create pre-recitation videos to prepare students for recitation activities

Class Format

- 3 credits
- Lecture 2x week (3:00pm-3:50pm T, Th)
 - Lecture 1x week
 - POGIL 1x week
- Recitation 1x week (50 min on W or F)
 - Pre-Recitation Videos
 - Quiz
 - Active-learning activity

Pre-Recitation Videos

- Content not covered in lecture
- Standardize information across sections
- EXISTING: 5-10 min lecture, animation, demonstration OR NEW: 5-10 min mini-lecture
- Required and content on recitation quiz

Benefits of Cooperative Learning

Increased measures of:

- Problem solving
- Knowledge acquisition and retention
- Higher-level reasoning
- Transfer of knowledge and skills
- Interest in material
- Exam scores
- Motivation
- Self-esteem
- Positive attitudes toward learning
- Better interpersonal relationships

Decreased D/F/W rates

(Farrell *et al.*, 1999, Hanson and Wolfskill 2000, Lewis and Lewis 2005, Hanson 2006, Prince and Felder 2007, Johnson *et al.* 2014)

POGIL

(process oriented guided inquiry learning)

- Problems in a real-world context
- Closer to process of scientific inquiry
- Instructor assigned “learning teams”
 - Mixed student groups
 - 3-4 students per group
- Content will be on quizzes/exams

Assessment of Student Learning Outcomes

- Clicker Questions in Lecture/Discussion
- POGIL Activities
- Recitation Activities
- Weekly Recitation Quizzes
- 2 Mid-Term Exams
- 1 Final Exam

Assessment of Transformation Goals

Goal 1: To improve student understanding and retention of course content

- Compare grades between Fall 2016 and Fall 2017
 - Grades on repeated recitations and recitation quizzes
 - Exam grades (question by question possible)
 - Final course grades
 - D/F/W rates
- Compare topics taught in lecture both semesters to those taught in POGIL format in 2017